CLAIMS

1. An infrared ray lamp comprising:

at least one heating element having a substantially plate shape, having recessed portions in the vicinities of both ends thereof and formed of a carbon-based substance,

heat-emitting blocks having good conductivity to which both end portions of said heating element are inserted and bonded,

a sintered substance of an adhesive formed and sintered on the bonding faces of said heating element bonded to said heat-emitting blocks at the regions in the vicinities of both end portions including the recessed portions of said heating element,

a glass tube in which said heating element, said sintered substance of said adhesive and said heat-emitting blocks are hermetically sealed together with an inert gas, and

lead wires electrically connected to said heat-emitting blocks, the end portions of which are led out of said glass tube.

2. An infrared ray lamp in accordance with claim 1, wherein a groove is formed in the face of said heat-emitting block bonded to said heating element.

3. An infrared ray lamp comprising:

at least one heating element having a

substantially plate shape, having recessed portions in the vicinities of both ends thereof, and formed of a carbon-based substance,

heat-emitting blocks having good conductivity and each split into two pieces, between which both end portions of said heating element are sandwiched,

a sintered substance of an adhesive formed and sintered on the bonding faces of said heating element bonded to said heat-emitting blocks at the regions in the vicinities of both end portions including the recessed portions of said heating element,

a glass tube in which said heating element, said sintered substance of said adhesive and said heat-emitting blocks are hermetically sealed together with an inert gas, and

lead wires electrically connected to said heat-emitting blocks, the end portions of which are taken outside said glass tube.

4. An infrared ray lamp in accordance with claim 3, wherein a projected portion is formed on at least one of said heat-emitting blocks so as to be fitted into said recessed portion of said heating element.

5. An infrared ray lamp in accordance with claim 1, 2, 3 or 4, wherein said heat-emitting blocks are formed of a carbon-based sintered substance.

6. An infrared ray lamp in accordance with claim

1, 2, 3 or 4, wherein said adhesive is formed of a liquid carbon-based substance that becomes a carbon-based sintered substance when heated.

7. A method of producing an infrared ray lamp comprising:

a step of forming recessed portions in the vicinities of both ends of at least one heating element having a substantially plate shape and formed of a carbon-based substance,

a step of applying a liquid adhesive formed of a carbon-based organic substance to the regions in the vicinities of both ends including the recessed portions of said heating element,

a step of inserting and bonding both end portions of said heating element to the end portions of heat-emitting blocks having good conductivity by using said adhesive,

a step of drying and firing said heat-emitting blocks and said heating element bonded to each other, and

a step of sealing said heating element and said heat-emitting blocks inside said glass tube together with an inert gas, and of taking the end portions of the lead wires electrically connected to said heat-emitting blocks outside said glass tube.

8. An infrared ray lamp comprising:

a heating element having a substantially plate

shape, the width of which is larger than its thickness by five times or more,

a glass tube in which said heating element is hermetically sealed, and

two electrodes embedded at both end portions of said glass tube, electrically connected to both ends of said heating element respectively and also electrically connected to an external electric circuit.

9. An infrared ray lamp in accordance with claim 8, further comprising:

two connection devices secured to both end portions of said heating element respectively and electrically connected to said heating element, and

lead wires secured to said connection devices and said electrodes so as to pull both ends of said heating element at a predetermined tension and used to electrically connect said connection devices to said electrodes.

10. An infrared ray lamp in accordance with claim 9, wherein said connection device has a heat-emitting block, the cross-sectional area of which is larger than the cross-sectional area of said heating element on a plane perpendicular to the direction of the current flowing through said heating element, in order to prevent said lead wires from being overheated by emitting heat transmitted from said heating element.

11. An infrared ray lamp in accordance with claim 8, wherein a reflection film for reflecting infrared rays is provided on the internal or external face of said glass tube so that the emission intensity of said infrared rays emitted from said heating element has a predetermined distribution.

12. An infrared ray lamp in accordance with claim 11, wherein said reflection film having a semi-cylindrical shape being substantially coaxial with the center line of said heating element in the longitudinal direction thereof is provided along substantially similar length as that of the infrared ray emitting portion of said heating element.

13. An infrared ray lamp in accordance with claim 11, wherein the cross section of said reflection film has a shape formed of a part of a parabola having its focus substantially on the center line of said heating element in the longitudinal direction thereof, along substantially similar length as that of the infrared ray emitting portion of said heating element.

14. An infrared ray lamp in accordance with claim 11, wherein the cross section of said reflection film has a shape formed of a part of an ellipse having one of its focuses substantially on the center line of said heating element in the longitudinal direction thereof, along substantially similar length as that of the infrared ray emitting portion of said heating element.

15. An infrared ray lamp in accordance with claim 12, wherein the central portion of the cross section of said reflection film is disposed so as to be opposed to the wider side portion of said heating element.

16. An infrared ray lamp in accordance with claim 12, wherein the central portion of the cross section of said reflection film is disposed so as to be opposed to the narrower side portion of said heating element.

17. A heating apparatus provided with an infrared ray lamp comprising:

a heating element having a substantially plate shape, the width of which is larger than its thickness by five times or more,

a glass tube in which said heating element is hermetically sealed, and

two electrodes embedded at both end portions of said glass tube, electrically connected to both ends of said heating element respectively and also electrically connected to an external electric circuit.

18. A heating apparatus in accordance with claim 17, wherein said infrared ray lamp further comprises:

two connection devices secured to both end portions of said heating element respectively and electrically connected to said heating element, and

lead wires secured to said connection devices and said electrodes so as to pull both ends of said heating

element at a predetermined tension and used to electrically connect said connection devices to said electrodes.

19. A heating apparatus in accordance with claim 17 or 18, further comprising a reflection plate for reflecting infrared rays so that the intensity of said infrared rays emitted from said heating element has a predetermined directional distribution.

20. A heating apparatus in accordance with claim 18, wherein said reflection plate has a semi-cylindrical shape being substantially coaxial with the center axis of said infrared ray lamp.

21. A heating apparatus in accordance with claim 18, wherein the cross section of said reflection plate has a shape formed of a part of a parabola having its focus substantially on the center axis of said infrared ray lamp.

22. A heating apparatus in accordance with claim 18, wherein the cross section of said reflection plate has a shape formed of a part of an ellipse having one of its focuses substantially on the center axis of said infrared ray lamp.

23. A heating apparatus in accordance with claim 19, wherein the central portion of the cross section of said reflection plate is disposed so as to be opposed to the wider side portion of said heating element.

24. A heating apparatus in accordance with claim

19, wherein the central portion of the cross section of said reflection plate is disposed so as to be opposed to the narrower side portion of said heating element.

25. A method of producing an infrared ray lamp, comprising:

a step of forming a glass tube by forming glass into a substantially cylindrical shape,

a step of hermetically sealing a substantially plate heating element, the width of which is larger than its thickness by five times or more, inside said glass tube so that the center line of said heating element in the longitudinal direction thereof is substantially coaxial with the center axis of said glass tube, and

a step of forming a reflection film for reflecting infrared rays into a substantially semi-cylindrical shape on the external face of the cylindrical shape of said glass tube so as to substantially include the range of the disposition of said heating element in the axial direction thereof.

26. A method of producing an infrared ray lamp, comprising:

a step of forming a glass tube by forming glass into a substantially cylindrical shape,

a step of forming a reflection film for reflecting infrared rays into a predetermined substantially semi-cylindrical shape on the external face

or the internal face of the cylindrical shape of said glass tube, and

a step of disposing a substantially plate heating element, the width of which is larger than its thickness by five times or more, so as to be included in the axial range wherein said reflection film is disposed, and of hermetically sealing said heating element inside said glass tube.